Baseband delay line TDA4661

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 µs)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals (±(R–Y) and ±(B–Y))
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz CCO, line-locked by the sandcastle pulse (64 µs line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour.

GENERAL DESCRIPTION

The TDA4661 is an integrated baseband delay line circuit with one line delay. It is suitable for decoders with colour-difference signal outputs ±(R–Y) and ±(B–Y).

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{P1}	analog supply voltage (pin 9)	4.5	5	6	V
V_{P2}	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P(tot)}$	total supply current	–	4.9	7.0	mA
V_I	±(R–Y) input signal PAL/NTSC (peak-to-peak value; pin 16)	–	525	–	mV
	±(B–Y) input signal PAL/NTSC (peak-to-peak value; pin 14)	–	665	–	mV
	±(R–Y) input signal SECAM (peak-to-peak value; pin 16)	–	1.05	–	V
	±(B–Y) input signal SECAM (peak-to-peak value; pin 14)	–	1.33	–	V
G_v	gain V_O / V_I of colour-difference output signals				
	V_{11} / V_{16} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{12} / V_{14} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{11} / V_{16} for SECAM	–0.6	–0.1	+0.4	dB
	V_{12} / V_{14} for SECAM	–0.6	–0.1	+0.4	dB

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA4661	DIP16	plastic dual in-line package; 16 leads (300 mil) long body	SOT38-4
TDA4661T	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1

BLOCK DIAGRAM

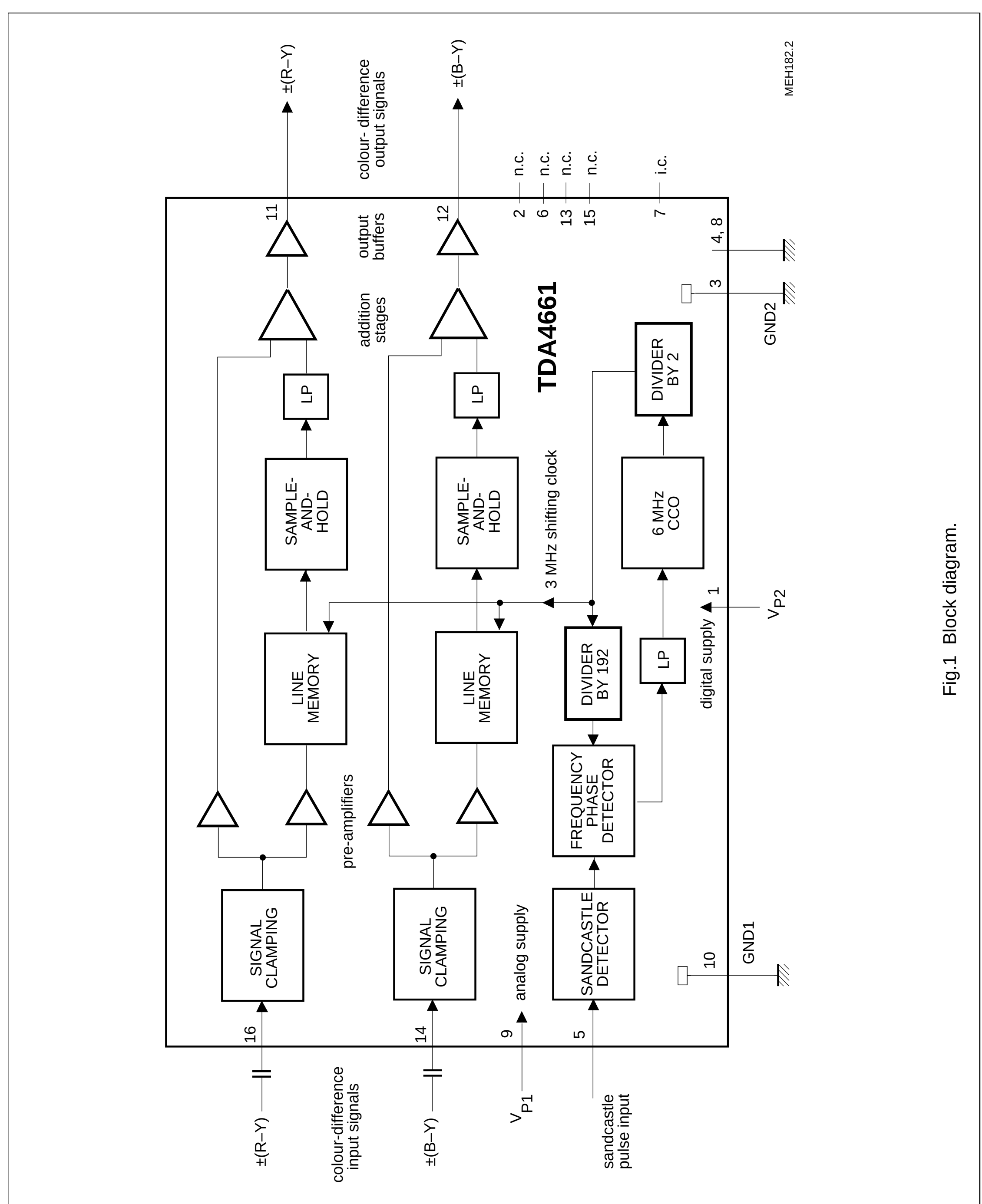


Fig.1 Block diagram.

PINNING

SYMBOL	PIN	DESCRIPTION
V_{P2}	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V_{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
$V_{O(R-Y)}$	11	±(R–Y) output signal
$V_{O(B-Y)}$	12	±(B–Y) output signal
n.c.	13	not connected
$V_{I(B-Y)}$	14	±(B–Y) input signal
n.c.	15	not connected
$V_{I(R-Y)}$	16	±(R–Y) input signal

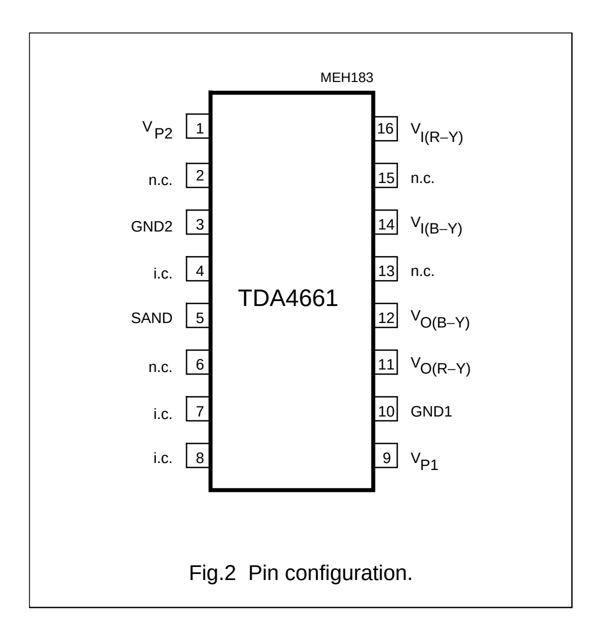


Fig.2 Pin configuration.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134). Ground pins 3 and 10 connected together.

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_{P1}	supply voltage (pin 9)	–0.5	+7	V
V_{P2}	supply voltage (pin 1)	–0.5	+7	V
V_5	voltage on pin 5	–0.5	V_P + 1.0	V
V_n	voltage on pins 11, 12, 14 and 16	–0.5	V_P	V
T_{stg}	storage temperature	–25	+150	°C
T_{amb}	operating ambient temperature	0	70	°C
V_{ESD}	electrostatic handling for all pins (note 1)	–	±500	V

Note

1. Equivalent to discharging a 200 pF capacitor through a 0 Ω series resistor.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
R_{thj-a}	thermal resistance from junction to ambient in free air		
	SOT38-4	75	K/W
	SOT109-1	220	K/W

CHARACTERISTICS

V_P = 5.0 V; input signals as specified in characteristics with 75% colour bars; super-sandcastle frequency of 15.625 kHz; T_{amb} = +25 °C; measurements taken in Fig.3 unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{P1}	supply voltage (analog part; pin 9)		4.5	5	6	V
V_{P2}	supply voltage (digital part; pin 1)		4.5	5	6	V
I_{P1}	supply current		–	4.2	6.0	mA
I_{P2}	supply current		–	0.7	1.0	mA
Colour-difference input signals						
V_I	input signal (peak-to-peak value)					
	±(R–Y) PAL and NTSC (pin 16)		–	525	–	mV
	±(B–Y) PAL and NTSC (pin 14)		–	665	–	mV
	±(R–Y) SECAM (pin 16)	note 1	–	1.05	–	V
	±(B–Y) SECAM (pin 14)	note 1	–	1.33	–	V
$V_{I(max)}$	maximum symmetrical input signal (peak-to-peak value)					
	±(R–Y) or ±(B–Y) for PAL and NTSC	before clipping	1	–	–	V
	±(R–Y) or ±(B–Y) for SECAM	before clipping	2	–	–	V
$R_{14,\ 16}$	input resistance		–	–	40	kΩ
$C_{14,\ 16}$	input capacitance		–	–	10	pF
$V_{14,\ 16}$	input clamping voltage	proportional to V_P	1.3	1.5	1.7	V
Colour-difference output signals						
V_O	output signal (peak-to-peak value)					
	±(R–Y) on pin 11	all standards	–	1.05	–	V
	±(B–Y) on pin 12	all standards	–	1.33	–	V
V_{11}/V_{12}	ratio of output amplitudes at equal input signals	$V_{I14,\ 16}$ = 1.33 V (p-p)	–0.4	0	+0.4	dB
$V_{11,\ 12}$	DC output voltage	proportional to V_P	2.5	2.9	3.3	V
$R_{11,\ 12}$	output resistance		–	330	400	Ω
G_v	gain for PAL and NTSC	ratio V_O/V_I	5.3	5.8	6.3	dB
	gain for SECAM	ratio V_O/V_I	–0.6	–0.1	+0.4	dB
V_n/V_{n+1}	ratio of output signals on pins 11 and 12 for adjacent time samples at constant input signals	$V_{I14,\ 16}$ = 1.33 V (p-p); SECAM signals	–0.1	0	+0.1	dB
V_n	noise voltage (RMS value; pins 11 and 12)	$V_{I14,\ 16}$ = 0 V; note 2	–	–	1.2	mV
S/N(W)	weighted signal-to-noise ratio	V_O = 1 V (p-p); note 2	–	54	–	dB
t_d	delay of delayed signals		63.94	64.0	64.06	µs
	delay of non-delayed signals		40	60	80	ns
t_{tr}	transient time of delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	350	–	ns
	transient time of non-delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	320	–	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Sandcastle pulse input (pin 5)						
f_{BK}	burst-key frequency		14.2	15.625	17.0	kHz
f_{SAND}	sandcastle frequency		14.2	15.625	17.0	kHz
V_5	top pulse voltage	note 3	4.0	–	$V_P + 1.0$	V
V_{slice}	internal slicing level		$V_5 - 1.0$	–	$V_5 - 0.5$	V
I_5	input current		–	–	10	μA
C_5	input capacitance		–	–	10	pF

Notes

1. The signal must be blanked line-sequentially. The blanking level must be equal to the non-colour signal.
2. Noise voltage at f = 10 kHz to 1 MHz; $V_{I14, 16} = 0$ ($R_S < 300\ \Omega$).
3. The leading edge of the burst-key pulse or H-blanking pulse is used for timing.

APPLICATION INFORMATION

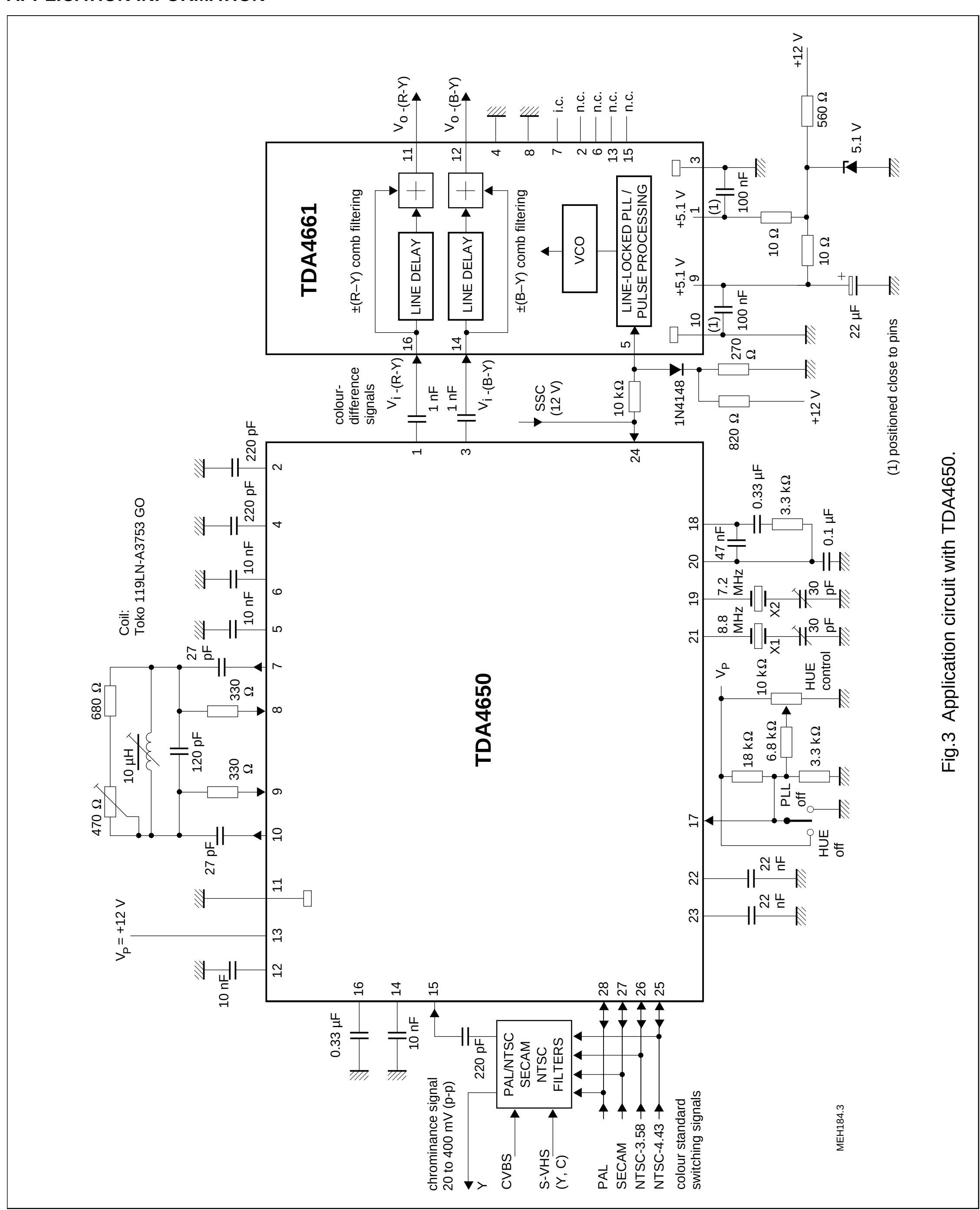


Fig.3 Application circuit with TDA4650.